

What we claim is:

1. A method for preparing a composition of matter containing at least one rare earth element comprising:

providing a first composition which comprises nanoparticles comprising at least one rare earth element; and

reacting the first composition with a substance wherein the reaction creates a composition comprising at least one rare earth element that is different from the first composition.

2. The method of claim 1, wherein the composition of matter is an inorganic compound.

3. The method of claim 1, wherein the composition of matter is an organic compound.

4. The method of claim 1, wherein the at least one rare earth element is scandium (Sc).

5. The method of claim 1, wherein the at least one rare earth element is yttrium (Y).

6. The method of claim 1, wherein the at least one rare earth element is lanthanum (La).

7. The method of claim 1, wherein the at least one rare earth element is cerium (Ce).

8. The method of claim 1, wherein the at least one rare earth element is praseodymium (Pr).

9. The method of claim 1, wherein the at least one rare earth element is selected from neodymium (Nd), samarium (Sm), gadolinium (Gd), terbium (Tb), dysprosium (Dy), holmium (Ho), erbium (Er), thulium (Tm), ytterbium (Yb), and lutetium (Lu).

10. The method of claim 1, wherein the at least one rare earth element is europium (Eu).
11. The method of claim 1, wherein the composition of matter comprises nanoparticles.
12. A product comprising the composition of matter of claim 1.
13. The method of claim 1, wherein the composition of matter comprises a dispersion.
14. The method of claim 1, wherein the surface area of nanoparticles is greater than 25 m<sup>2</sup>/gm.
15. The method of claim 1, wherein the composition of matter comprises submicron particles.
16. The method of claim 1, wherein the composition of matter comprises at least one precursor.
17. The method of claim 1, wherein the first composition comprises at least one oxide.
18. The method of claim 1, wherein the first composition comprises at least one carbonate.
19. The method of claim 1, wherein the first composition comprises at least one nitrate.
20. The method of claim 1, wherein the first composition comprises at least one hydroxide.